Ex. PGS 1032

United States Patent [19]

Rouquette

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[54] **TWO-WIRE MULTI-CHANNEL STREAMER COMMUNICATION SYSTEM**

[75] Inventor: Robert E. Rouquette, Kenner, La.

[73] Assignee: The Laitram Corporation, Harahan, La.

[21] Appl. No.: 825,007

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[51] Int. Cl.^{5} G01V 1/22
[52] U.S. Cl. 367/76
[58] Field of Search 367/20, 76, 80; 340/870.18, 870.26, 854.9

[56] **References Cited**

U.S. PATENT DOCUMENTS

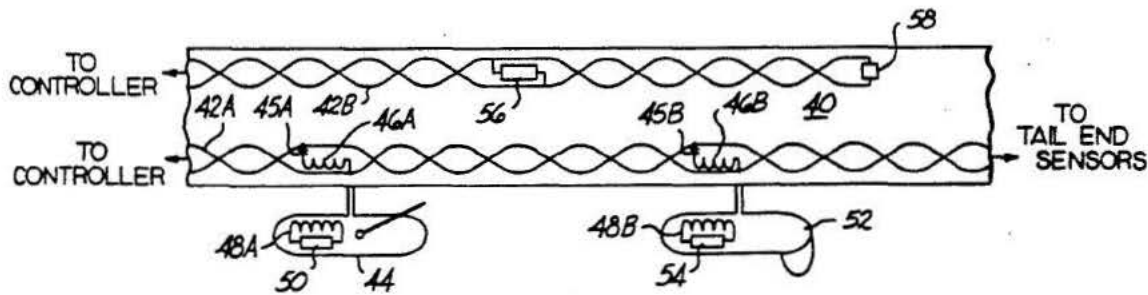|			
3,958,216	5/1976	Chapman	367/80
4,219,810	8/1980	Joosten	340/853
4,912,684	3/1990	Fowler	367/76
4,967,400	10/1990	Woods	367/21

Primary Examiner—Ian J. Lobo
Attorney, Agent, or Firm—James T. Cronvich

[57] **ABSTRACT**

For use with marine seismic streamers, a two-wire, multi-channel communication system capable of handling the high throughput necessary for effective communication between a central controller aboard a tow vessel and the many sensors deployed along the streamer. The central controller includes an intelligent modem with the capability of transmitting and receiving frequency-modulated message signals on one or more signal lines, such as conventional twisted-pair wires, over a number of individual inbound and outbound frequency channels. In the preferred embodiment, seventeen channels are spread over a frequency band ranging from about 20 kHz to 100 kHz, thereby making available for communication a bandwidth much wider than available in conventional single-channel streamer communication. In this way, many positioning sensors, such as compasses, depth sensors, cable-leveling birds, and acoustic-ranging transceivers, attached to the streamer and each having a transmitter and receiver tuned to one of the modem's inbound and outbound channels, respectively, can be put in communication with the modem. To take advantage of its high through-put capability, the intelligent modem refers to a stored table of individual sensor parameters, such as sensor type, transmit channel, and receive channel, to schedule an efficient scan of the sensors. As a diagnostic tool, the communication system also monitors the quality and performance of the communication link by measuring and recording such parameters as the transmitted and received signal strengths, signal-to-noise ratios, and number of incorrectly received messages.
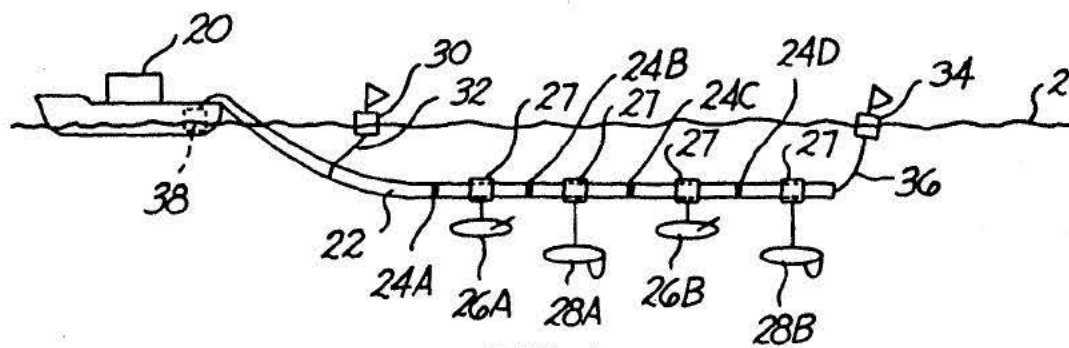
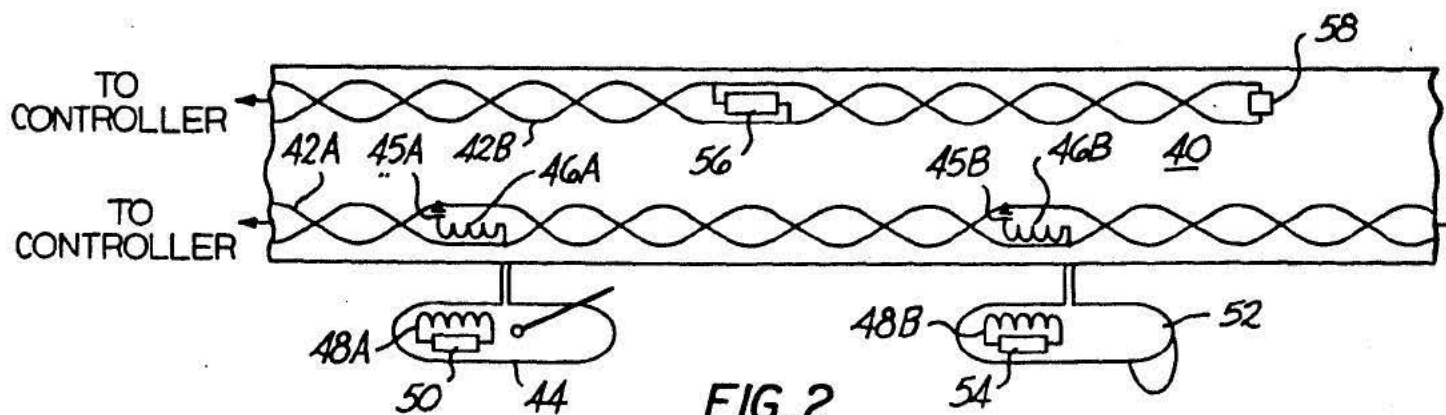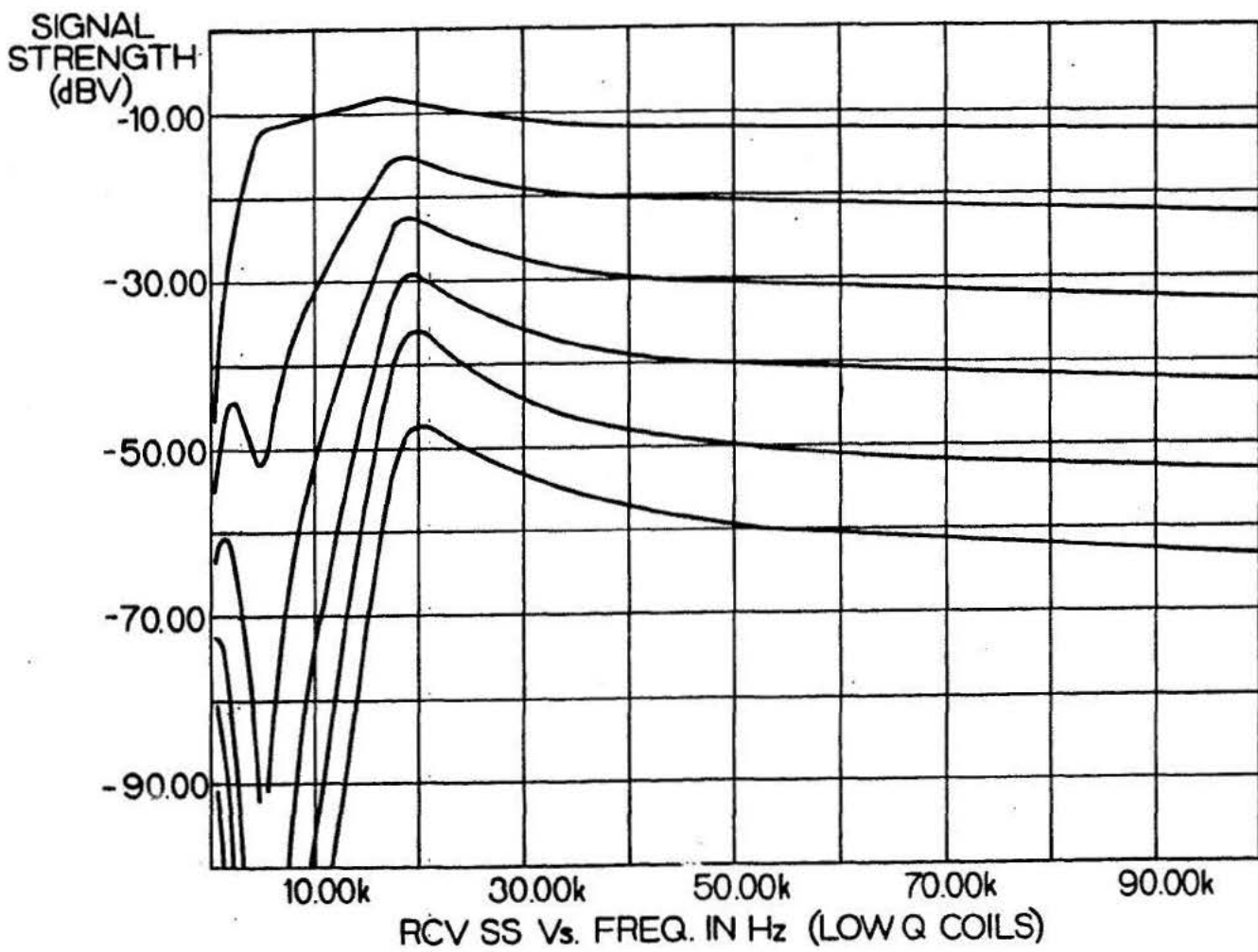**25 Claims, 9 Drawing Sheets**

FIG. I

FIG. 2

FIG. 3A

SIGNAL STRENGTH (dBV)

RCV SS Vs FREQ. IN Hz   (HIGH Q COILS)

FIG. 3B

Ex. PGS 1032

DOCKET ALARM
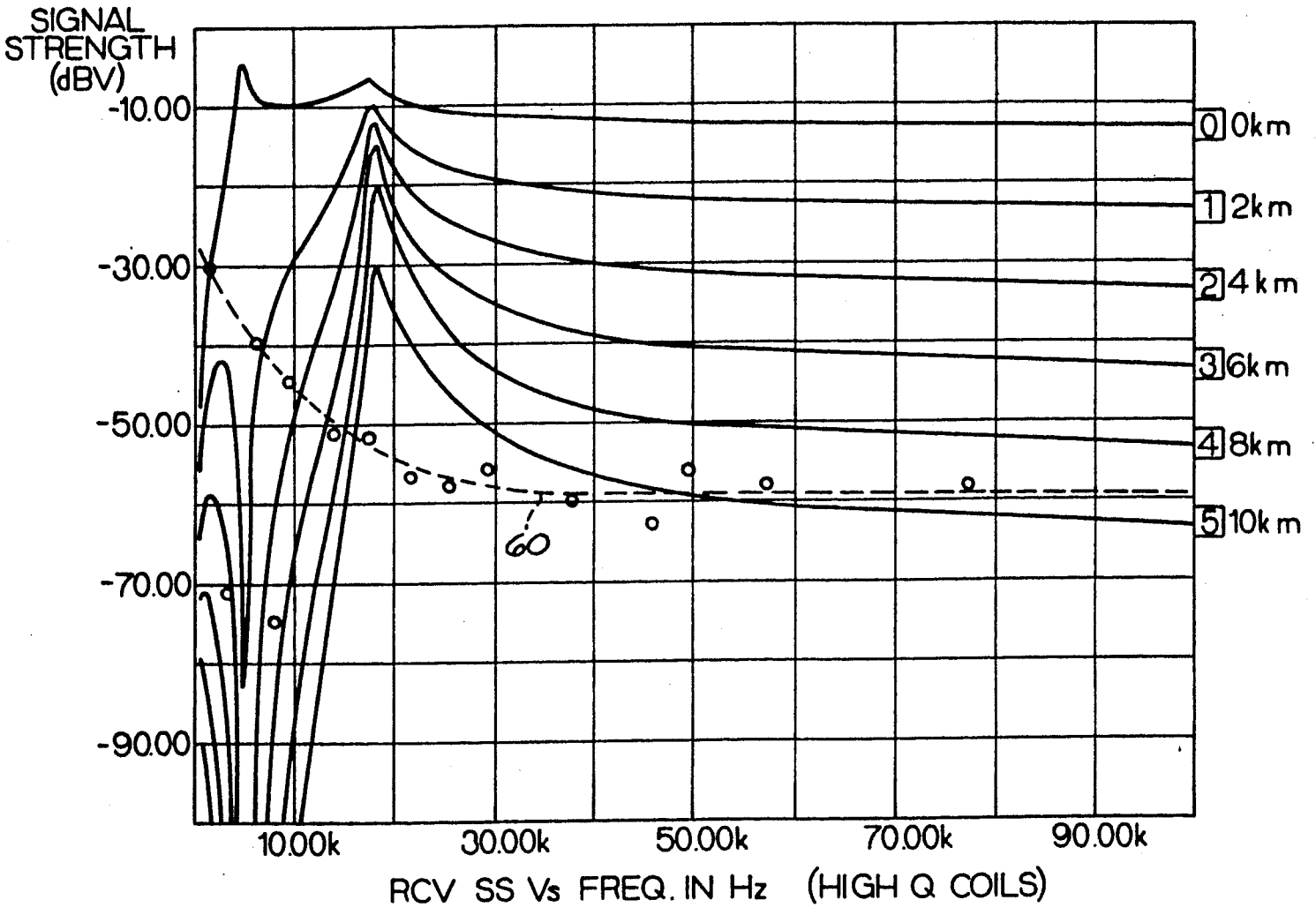
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